convulsions on the average of one every six minutes until 9:00 a. m., raising the total number of convulsions to seventy. During this time the pulse rose from 97 to 170 and the patient apparently was moribund. A spinal puncture was done and morphine, atrophine and caffein administered hypodermically. At 8:20 a. m., 300 cc. of blood were withdrawn from a vein and one cc. of ergot was given intramuscularly which was later repeated by one 2 cc. dose. Throughout the day 4% solution of soda bicarbonate was given by nasal gavage in large amounts and 500 cc. of Fisher's solution was given by rectum. Towards evening the patient began to perspire profusely and had evidence of beginning oedema of the lungs. Mustard packs were applied to the chest and back and atropine administered. A blood count at 8:45 p. m. showed 2,590,000 red cells, 50% haemoglobin, 15,600 white cells with 91% polymorphoneuclears. At 11:00 a. m. the blood pressure was 100 systolic and 50 diastolic, at 6:00 p. m. the systolic pressure was 135 and the diastolic pressure 45. The temperature was 103.2, respiration 22 and pulse 142 at 8:00 p. m. The next day constant moving of the lips began which could not be controlled. There was considerable cough and numerous moist rales in the chest. A second attack of oedema of the lungs developed during the night of the sixth day and throughout the seventh day, with temperature of 103, pulse 150, and respirations 38. This attack was treated with digitalis and mustard plasters to back and chest. The temperature however, gradually fell to normal on the eleventh day but rose to 104 again on the sixteenth day, then gradually came to normal on the twentieth day post partum. The pulse continued high until the twentieth day when it fell to 90 per minute. The respirations continued at 30 or above until the twentieh day when they became normal. On the seventh day the patient began to suck her lower lip constantly until it became very much swollen. Lumbar puncture was done which showed less than one leucocyte per cm., and was harmless to guinea pigs when injected into the peritoneal cavity. On the eighth day she spoke several unintelligible sentences and began picking at the bed clothes and picking her nose. On the ninth day there was constant humming of old songs and on the tenth day she seemed to recognize her husband and father. On the eleventh day she became very delirious, trying to get out of bed, etc., which condition continued until the fifteenth day when she became quite rational although her mental condition remained unstable. On the twenty-eighth day, according to the Binet-Simon scale her mentality was that of a child of from 10 to 11 years of age with partial agraphia. Treatment consisted largely in the administration of sedatives, carbohydrates and alkalies. The urine was normal after the fourteenth day except for a large number of pus cells. The abdominal stitches were removed on the twelfth day with primary healing.

The patient left the hospital on the thirty-ninth day in about the same mental condition as was noted for pregnancy. The baby was gaining on bottle feeding.

Bibliography.

1. Zweifel, E. Zentralblatt fur die Gesamte Gynaekological, 1914, No. 5, S. 385.
2. Townsend. Boston Medical and Surgical Journal, 1897, CXXXVI, No. 9, p. 207.
3. Trimble. Journal of American Obstetrics, 1890, Vol. 23, p. 823.
4. Esch. Zeitschrift fur Geburtshulfe und Gynaekologie, 1906, Bd. 58, S. 11.
5. Seitz. Archives fur Gynaekologie, 1909, Bd. 87, S. 78.
6. Lichtenstein. Archives fur Gynaekologie, 1912, No. 95, p. 183.
7. Glockner. Archives fur Gynekologie, 1901, Bd. 63, S. 166.
8. Barret & Harger. American Journal of Obstetrics, 1909, No. 60, p. 463.
9. Purslow. The Lancet, 1915, Vol. 1, p. 307.
10. Lichtenstein. Archives fur Gynekologie, 1912, No. 95, S. 183.
11. Loeffler. Inangural Disertation, Wurtzburg, 1900.
12. Depaul. Lecons de Clinique Obstetricale, Paris, 1876.
13. Engleman. Zentralblatt fur Gynaekologie, Vol. 31, 1907, S. 306.
14. Jardine. Obstetrical Transactions, 1905-06, Vol. XXXI, p. 162.
15. Aale. Zentralblatt fur Gynekologie, No. 30, 1906, S. 1034.

THE SURGICAL TREATMENT OF ACUTE OTITIS MEDIA IN CHILDREN, WITH REPORT OF FIFTY CONSECUTIVE CASES.*

J. A. BACHER, M. D., San Francisco.

From the Department of Otology, Rhinology and Laryngology of the Stanford University Medical Department.

Adenoidectomy coincident with incision of the membrana tympani, even though the membrane has ruptured spontaneously, is not described in the literature or the texts as the surgical treatment of acute purulent otitis media in children. I wish to report fifty consecutive cases that I have so treated in the Ear, Nose and Throat Clinic of the Stanford University Medical Department. I believe that these cases have recovered in fewer days with a smaller percentage of mastoids than they would have if I had not removed the adenoids and incised the membrana. A detailed statement of the duration of these cases may serve as an impetus to discussion of comparative figures. The indications for incision of the membrana tympani are not stated with uniformity and I wish to record my ideas of them.

Heine states that incision of the membrana tympani was first done in the last half of the eighteenth century by Eli, a quack of Paris, for the cure of deafness and that Himly and Cooper in the beginning of the nineteenth century were the first surgeons to perform the operation. They performed it as a cure for deafness. The procedure was soon discarded. Schwartze in 1865 was the first to incise the membrana tympani for the removal of fluid. The indications for this procedure as stated by him have been altered but slightly in the literature to date. He details the indications in serous otitis at length but we are not concerned with that type. In purulent otitis he states that incision is indicated if spontaneous perforation of membrane is delayed, and enlarges upon this by stating that incision is indicated when the membrane is red, dull and lusterless. As late as 1902 Piffl in the proceedings of the German Otological Society very strongly discredited incision of the membrane and believed in waiting for seven or eight days and then incising and performing a mastoidectomy if there was not immediate improvement. In other words he believed that any case extensively enough involved to require an incision of the membrane would require opening of the mastoid whether the incision was made or not. Heine in 1907 makes his indication "If the membrane is locally or generally bulged outward and a slight yellowish

* Read before the Forty-ninth Annual Meeting of the Medical Society of the State of California, Santa Barbara, May 1920.

discoloration points to the presence of secretion behind it; and if, further, fever and severe pain are present." He believes that incision is indicated in spontaneous perforation when there are signs of inefficient drainage.

I think the membrane should be incised when it has ruptured spontaneously and there is pulsation in the fundus, as there practically always is in children. When examination shows a membrane that is uniformly red with the short process of the malleus indistinguishable and there has been evidence of the child's suffering pain, or when there is fever not explainable by other physical findings, or if reliable hearing test reveals great diminution of hearing I believe incision should be made. I find it rather difficult to express in words the exact appearance of the membrane that alone would indicate incision, for one of the three other factors that I have mentioned is nearly always present, but there is a uniform diffuse red swelling that is generally distinguishable from myringitis. If the membrane is partially white and partially red and the malleus can be discerned, or if there is a bleb-like formation of part of the membrane with other parts almost normal in color I do not incise it. In infants, as many of these cases are, all one gets at best is a picture of color in the fundus. One must be sure that he sees the membrane and not the canal wall. Compare it with the membrane of the other ear to get the contour and if it is red and not white and there is fever or pain it should be incised.

In these fifty cases reported my procedure has been to make a long incision with a straight knife in the posterior inferior quadrant. There have been many favored sites for the incision; vertical incisions, Lake, in 1917 favoring a horizontal semi-lunar incision superiorly, claiming that this lets the flap down and secures better drainage. But the partial horizontal position of the membrane in children gives the incision in the posterior inferior quadrant all necessary drainage.

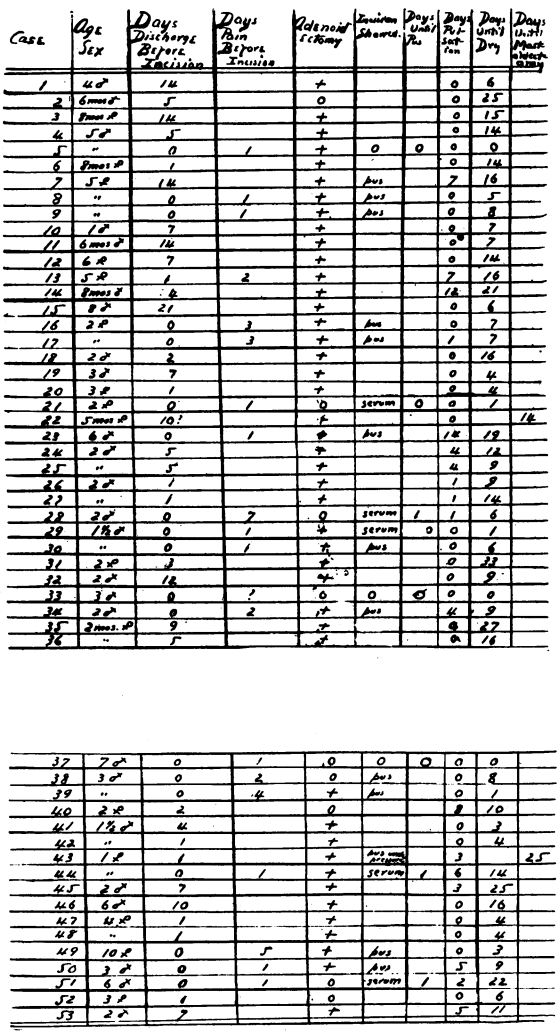
I have the child lying on the table, arms and legs held by one nurse and head by another nurse, unless gas is given, and incise the membrane. With the child lying on its back I remove the adenoid with the La Force basket adenotome. In infants one must use the small Gottstein curette. In using an open curette there is danger of losing the tissue that has been excised. I can generally manipulate the curette so that it holds the adenoid that I have excised astride the blade. But I always hold the wooden tongue depresser back against the posterior pharyngeal wall until I see whether I have the tissue engaged on the curette; and if I have not I keep it from falling down with the tongue blade and so manipulate the blade and the curette as to hook the tissue around the curette and remove it. The child is then at once raised and supported, with its face over a basin. The adenoid comes out very prettily in one large mass with the La Force adenotome and there is surprisingly little hemorrhage. I do not believe in giving a general anesthetic and removing the tonsils during the acute otitis, but of course, do remove the tonsils as soon as recovery is made. If there is no pus or only serum upon incision I use no treatment until pus appears. If there is pus present I keep it cleaned out with various strengths of alcohol. I have seen all these cases daily except Saturday and Sunday, wiped the pus out, noted whether there was any pulsation and given instructions for more efficient treatment if necessary. As these are all clinic cases they have not generally been cared for at home as thoroughly as private cases are.

There are few figures in the literature as to the duration of the discharge. Dench states that they *"should"* clear up in ten to twenty-one days after the incision. The following are the figures given in a few of the texts and mean, time from appearance of pus to the disappearance of pus:

Phillips, 1916—Three days to six weeks.
Ballenger, 1909—One to three weeks.
Alexander, 1917—Eighteen to twenty-five days.
Kerrison, 1913—Ten days to four weeks.
Bacon, 1902—Few days to ten days.
Herel, 1901—Several weeks.
Grayson, 1902—Two or three weeks.
Packard, 1909—Two or three weeks.
Cradle, 1902—"Rarely less than ten to fifteen days and often three to four weeks."
Tod, 1913—Four to six weeks.
Porter—Few days to two or eight weeks.
Heiman—From two to six weeks.

The variance in these figures is due to the personal equation and I do not think they were all arrived at by actual figures of cases, but rather drawn as general conclusions from the authors' impressions and recollections.

In my fifty cases, the average time from the incision to recovery is eleven days. Allowance must be made that these cases were already discharging for an average of four days before surgical intervention. Of these fifty cases, mastoidectomy was necessary in two, or four per cent. This does not mean that I performed only two mastoidectomies in children during this period; but in all the others that I performed, mastoidectomy was indicated at the first visit. During this series I incised three membrances without obtaining serum or pus and without infecting one of them, watching them till the membrane became normal. This can be safely done if the knife does not touch the canal wall and if no lavage is used. There were fifteen cases in which there was not spontaneous perforation of the membrane. The average duration from the time I incised these membranes until the ears were dry was nine days. I was unable to obtain the parents' consent to do an adenoidectomy in six of the purulent cases. Case forty-nine was well in three days and case thirty-nine in one day. Cases thirty-five and thirty-six were double otitis in an infant of two months. This was the youngest case in the series. This case illustrates the



efficacy of my procedures in incising the membrane and removing the adenoid even though there has been spontaneous perforation of the membrane. For one ear had been discharging for five days and was well in sixteen, while the one that had been discharging for nine days was not well until twenty-seven. Case forty-three, even though it had been discharging spontaneously for one day, showed pus, under pressure, enough to fill the canal at the time of the incision. The three cases that showed serum upon incision all showed pus after twenty-four hours.

Bibliography.

Bailey, H., Southwest Journal Med. and Surg., XXVI, 81, 1918.

Ballance, C. A., Essays on the Surgery of the Temporal Bone, 1919.

Barany, R,. Hygeia, Stockholm. February 16, 1920.

Dench, Journal A. M. A., LXIX, 878, 1917.

Dighton, A., Journal Ophth., and Oto-Larnygol., XI, 9, 1917.

Emerson, W. R. P., Boston Med. and Surg. Journal, CLXXIII, 616, 1915.

Fifield, H. L., Medical Record, LXXXVI. 249, 1914.

Guttman, J., Laryngoscope, XXVI, 1043, 1916.

Harris, T. J., Larnygoscope, XXIX, 540, 1919.

Heine, B., Operations on Ear, 1907.

Hewatt, J., Journal Laryngol., Rhinol., and Biolo., XXIX, 261.

James, J. H., Journal Lancet, XXXVII, 474, 1917.

Lake, R., Lancet, CXCVI, 977, 1917.

Lawrence, G. H., Wisconsin Medical Journal, XVIII, 95, 1919.

Proceedings of the German Otological Society, 1902.

Weinbarger, N. S., Penn. Medical Journal, XX, 317, 1917.

White, E. H., Canadian Med. Assoc. Journal, VI, 516, 1916.

Wood, G. B., Penn. Medical Journal, XXI, 152, 1917.

HOOKWORM AND AMOEBIASIS IN CALIFORNIA.*

By C. A. KOFOID, Professor of Zoology, University of California, Berkeley, California

Two diseases of parasitic origin which may be expected to appear in the routine of any physician's practice in California are hookworm and amoebiasis. Both are infections primarily of the digestive tract and may be detected by faecal examination, though their symptoms are exceedingly varied, and, especially in the case of amoebiasis, may give no clue to the location and nature of the infection.

Hookworm infections owe their presence among us to a variety of sources and are mainly importations from the Orient with Chinese, Japanese, Hindu, Korean, and Filipinos who may have entered the State prior to the very efficient guard against this disease by the United States Bureau of Public Health, or may have escaped its scrutiny altogether; or have been passed as clear or cured. Another source of infection is the Mexican and Central American element, and a third rather important one is among immigrants from the endemic area of hookworm in the Southern States.

The most important center of the disease is, however, among the miners of the Mother Lode in Amador County. This had its origin in the early days of the gold mines. The disease was brought here from the infected mines of Europe, and still receives contributions in miners from the Balkan States, Italy, and Spain, and drifts in also from Nevada and other mining regions with migrant labor.

Examinations made in the last two years of 2747 miners from the gold, copper, and quicksilver mines of California revealed 295 cases of infection or 10.8 per cent. This was based on one examination. If more than one had been made the percentage would be somewhat higher.

These infections are among male adult white laborers and employers and are distributed as follows:

	No. Men Examined	No. Men Infected	Per Cent. Infected
Gold mines	2123	278	13.1
Copper mines	441	11	2.5
Quicksilver mines	117	1	0.8
Hetch Hetchy tunnel	66	5	7.6
Total	2747	295	10.8

This infection has in the past been maintained in the mines by imperfect sanitation, careless deposition of faeces of infected men in localities where the wet earth and drainage water becomes contaminated with the larval worms which hatch out

* Read before the Forty-ninth Annual Meeting of the Medical Society of the State of California, Santa Barbara, May, 1920.